

Transactions OF THE ASME

Published Quarterly by The American Society of Mechanical Engineers

December 1987

Journal of Applied Mechanics

Transactions of the ASME®

Technical Editor, L. B. FREUND

Division of Engineering
Brown University
Providence, R.I. 02912

APPLIED MECHANICS DIVISION

Chairman, THOMAS L. GEERS
Secretary, S. LEIBOVICH
Associate Editors,
D. B. BOGY
R. M. CHRISTENSEN
R. J. CLIFTON
R. L. HUSTON
W. D. IWAN
L. M. KEER
W. G. KNAUSS
F. A. LECKIE
J. T. C. LIU
R. M. McMEEKING
FRANCIS C. MOON
A. K. NOOR
J. W. NUNZIATO
R. H. PLAUT
J. G. SIMMONDS
K. R. SREENIVASAN
Z. WARHAF
L. T. WHEELER

BOARD ON COMMUNICATIONS

Chairman and Vice-President:
K. N. REID, JR.

Members-at-Large
J. T. COKONIS
M. FRANKE
M. KUTZ
F. LANDIS
J. R. LLOYD
T. C. MIN
R. E. NICKELL
R. E. REDER
R. ROCKE
F. W. SCHMIDT
W. O. WINER

President, R. ROSENBERG
Exec. Dir.
D. L. BELDEN

Treasurer, ROBERT A. BENNETT

PUBLISHING STAFF
Mng. Dir., Mktg., JOS. SANSONE
Managing Editor,
CORNELIA MONAHAN
Production Editor, REMO SALTA
Prod. Asst., MARISOL ANDINO

Transactions of the ASME, Journal of Applied Mechanics (ISSN 0021-8936) is published quarterly (Mar., June, Sept., Dec.) for \$110 per year by The American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017. Second class postage paid at New York, NY and additional mailing offices. POSTMASTER: Send address changes to The Journal of Applied Mechanics, c/o THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS, 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300.

CHANGES OF ADDRESS must be received at Society headquarters seven weeks before they are to be effective. Please send old label and new address.

PRICES: To members, \$27.00, annually; to nonmembers, \$115.00. Add \$12.00 for postage to countries outside the United States and Canada.

STATEMENT from *Pi* Laws. The Society shall not be responsible for statements or opinions advanced in papers or . . . printed in its publications (B7.1, Par. 3).

COPYRIGHT © 1987 by the American Society of Mechanical Engineers. Reprints from this publication may be made on condition that full credit be given to the JOURNAL OF APPLIED MECHANICS, and the author, and date of publication be stated.

INDEXED by Applied Mechanics Reviews and
Engineering Information, Inc.

Journal of Applied Mechanics

Published Quarterly by The American Society of Mechanical Engineers

VOLUME 54 • NUMBER 4 • DECEMBER 1987

753 Announcement of a New Technical Editor

TECHNICAL PAPERS

- 754 Characterization of Cracks From Ultrasonic Scattering Data
J. D. Achenbach, D. A. Sotiropoulos, and H. Zhu
- 761 Elastic Wave Scattering by Surface-Breaking Planar and Nonplanar Cracks
A. H. Shah, Y. F. Chin, and S. K. Datta
- 768 Variational Principles for Some Nonstandard Elastic Problems
R. T. Shield
- 772 Sufficient Symmetry Conditions for Isotropy of the Elastic Moduli Tensor (87-WA/APM-18)
R. M. Christensen
- 778 Torsion of Cylinders with Shape Intrinsic Orthotropy (88-WA/APM-3)
S. C. Cowin
- 783 Poroelastic Solution of a Plane Strain Point Displacement Discontinuity (87-WA/APM-22)
E. Detournay and A. H.-D. Cheng
- 788 Wave Propagation Through Fluid Saturated Porous Rocks
K. Walton and P. J. Digby
- 794 Steady Flow in Porous, Elastically Deformable Materials
K. H. Parker, R. V. Mehta, and C. G. Caro
- 801 Shear Flows of Rapidly Flowing Granular Materials (87-WA/APM-27)
J. S. Patton, C. E. Brennen, and R. H. Sabersky
- 806 Analytical Characterization of Shear Localization in Thermoviscoplastic Materials (87-WA/APM-26)
A. Molinari and R. J. Clifton
- 813 Thermal Conditions for Inhibition of Stress Induced Slip in Zinc-Blende Crystals in Czochralski Growth Configuration
S. Motakef
- 822 A Micromechanical Theory of High Temperature Creep
G. J. Weng
- 828 Crack Paralleling an Interface Between Dissimilar Materials
J. W. Hutchinson, M. E. Mear, and J. R. Rice
- 833 On the Use of a Path-Independent Line Integral for Axisymmetric Cracks with Nonaxisymmetric Loading
An-Yu Kuo
- 838 A Finite Element Study of Stable Crack Growth Under Plane Stress Conditions; Part I — Elastic-Perfectly Plastic Solids (87-WA/APM-20)
R. Narasimhan, A. J. Rosakis, and J. F. Hall
- 846 A Finite Element Study of Stable Crack Growth Under Plane Stress Conditions; Part II — Influence of Hardening (87-WA/APM-21)
R. Narasimhan, A. J. Rosakis, and J. F. Hall
- 854 Transient Thermoelastic Fields in a Transversely Isotropic Infinite Solid with a Penny-Shaped Crack (88-WA/APM-2)
N. Noda and F. Ashida
- 861 Circumferential Crack at the Fixed End of a Cylinder in Flexure (87-WA/APM-17)
J. A. Alabi
- 866 Treatment of Body Forces in 2D Elastostatic BEM Using Particular Integrals (87-WA/APM-28)
D. A. Pape and P. K. Banerjee
- 872 Analysis of Orthogonally Cracked Laminates Under Tension
Z. Hashin
- 880 Effective Medium Approach to Matrix-Inclusion Type Composite Materials (87-WA/APM-23)
S. Nomura
- 884 The Wrinkling of Thin Membranes: Part I — Theory (87-WA/APM-24)
D. G. Roddeman, J. Drukker, C. W. J. Oomens, and J. D. Janssen
- 888 The Wrinkling of Thin Membranes: Part II — Numerical Analysis (87-WA/APM-25)
D. G. Roddeman, J. Drukker, C. W. J. Oomens, and J. D. Janssen
- 893 Bisynchronous Torsional Vibrations in Rotating Shafts
O. Bernasconi
- 898 Closed-Form Analysis for Elastic Deformations of Multilayered Strands (87-WA/APM-19)
K. Kumar and J. E. Cochran, Jr.
- 904 A Method to Improve the Modal Convergence for Structures with External Forcing (88-WA/APM-1)
Keqin Gu and Benson H. Tongue
- 910 General Dynamic Equations of Helical Springs with Static Solution and Experimental Verification
Yuyi Lin and Albert P. Pisano

(Contents continued on Inside Back Cover)